**Anomalous Behaviour Detection System (ABDS)**

**Group Members:**

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**Section:** O – 2

**Submitted To:** Ma’am Sarah Javed

**Q**: Identify 10 functional requirements of your project and prioritize them using the given requirement prioritization techniques. (Refer Slide Set 13 and 14 for Help)

**Functional Requirements:**

* The shifting of power source from main to backup and vice versa should not be more than 1 second.
* The System should have two modes, active and passive, and user can control which mode to turn on or they can set a timer.
* The system should have local and cloud storage options for storing footage.
* The system should be configurable with a smartphone.
* The system should have enough modularity that new cameras and features can be added easily.
* The live feed from the cameras should be displayed remotely to a phone.
* The system should automatically detect suspicious behavior.
* There should be backup power in case of power outage.
* If a camera goes offline or the system is tampered with or is being turned off manually, the user should be notified on the configured device.
* The user data such as CCTV footages, daily activity reports and personal information should be protected.

**Wieger’s Prioritization:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Relative Weights | 3 | 2 |  |  | 2 |  | 3 |  |  |  |
| Feature | Relative Benefit | Relative Penalty | Total Value | Value % | Relative Cost | Cost % | Relative Risk | Risk % | Priority Value | Priority Ranking\* |
|  |  |  |  |  |  |  |  |  |  |  |
| R1 | 5 | 5 | 25 | 8.14 | 7 | 11.47 | 4 | 7.40 | 0.180 | 6th |
| R2 | 7 | 6 | 33 | 10.74 | 9 | 14.75 | 3 | 5.55 | 0.232 | 3rd |
| R3 | 6 | 8 | 34 | 11.07 | 9 | 14.75 | 8 | 14.81 | 0.149 | 9th |
| R4 | 3 | 9 | 27 | 8.79 | 6 | 9.83 | 2 | 3.70 | 0.285 | 2nd |
| R5 | 9 | 2 | 31 | 10.09 | 3 | 4.91 | 9 | 16.66 | 0.168 | 7th |
| R6 | 7 | 6 | 33 | 10.7 | 5 | 8.19 | 6 | 11.11 | 0.215 | 4th |
| R7 | 10 | 8 | 46 | 14.9 | 4 | 6.55 | 3 | 5.55 | 0.500 | 1st |
| R8 | 6 | 7 | 32 | 10.42 | 7 | 11.47 | 5 | 9.25 | 0.205 | 5th |
| R9 | 3 | 6 | 21 | 6.84 | 5 | 8.19 | 9 | 16.66 | 0.102 | 10th |
| R10 | 7 | 2 | 25 | 8.14 | 6 | 9.83 | 6 | 11.11 | 0.153 | 8th |
| TOTAL |  |  | 307 |  | 61 |  | 54 |  |  |  |

**Ranking in Descending Order:**

1. If a camera goes offline or the system is tampered with or is being turned off manually, the user should be notified on the configured device.
2. The system should have local and cloud storage options for storing footage.
3. The user data such as CCTV footages, daily activity reports and personal information should be protected.
4. The system should have enough modularity that new cameras and features can be added easily
5. The shifting of power source from main to backup and vice versa should not be more than 1 second
6. There should be backup power in case of power outage.
7. The live feed from the cameras should be displayed remotely to a phone.
8. The System should have two modes, active and passive, and user can control which mode to turn on or they can set a timer.
9. The system should be configurable with a smartphone.
10. The system should automatically detect suspicious behavior.

**Analytic Hierarchy Process:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 |
| R1 | 1 | 1/4 | 4 | 1/5 | 3 | 1/3 | 1/6 | 1/3 | 5 | 3 |
| R2 | 4 | 1 | 7 | 1/3 | 5 | 2 | 1/3 | 3 | 8 | 6 |
| R3 | 1/4 | 1/7 | 1 | 1/8 | 1/3 | 1/6 | 1/9 | 1/5 | 2 | 1/2 |
| R4 | 5 | 3 | 8 | 1 | 6 | 3 | 1/2 | 4 | 9 | 7 |
| R5 | 1/3 | 1/5 | 3 | 1/6 | 1 | 1/4 | 1/7 | 1/3 | 4 | 2 |
| R6 | 3 | 1/2 | 6 | 1/3 | 4 | 1 | 1/4 | 2 | 1/7 | 5 |
| R7 | 6 | 3 | 9 | 2 | 7 | 4 | 1 | 5 | 9 | 8 |
| R8 | 3 | 1/3 | 5 | 1/4 | 3 | 1/2 | 1/5 | 1 | 6 | 4 |
| R9 | 1/5 | 1/8 | 1/2 | 1/9 | 1/4 | 7 | 1/9 | 1/6 | 1 | 1/3 |
| R10 | 1/3 | 1/6 | 2 | 1/7 | 1/2 | 1/5 | 1/8 | 1/4 | 3 | 1 |

Now finding the sum of each column

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 |
| R1 | 1 | 1/4 | 4 | 1/5 | 3 | 1/3 | 1/6 | 1/3 | 5 | 3 |
| R2 | 4 | 1 | 7 | 1/3 | 5 | 2 | 1/3 | 3 | 8 | 6 |
| R3 | 1/4 | 1/7 | 1 | 1/8 | 1/3 | 1/6 | 1/9 | 1/5 | 2 | 1/2 |
| R4 | 5 | 3 | 8 | 1 | 6 | 3 | 1/2 | 4 | 9 | 7 |
| R5 | 1/3 | 1/5 | 3 | 1/6 | 1 | 1/4 | 1/7 | 1/3 | 4 | 2 |
| R6 | 3 | 1/2 | 6 | 1/3 | 4 | 1 | 1/4 | 2 | 1/7 | 5 |
| R7 | 6 | 3 | 9 | 2 | 7 | 4 | 1 | 5 | 9 | 8 |
| R8 | 3 | 1/3 | 5 | 1/4 | 3 | 1/2 | 1/5 | 1 | 6 | 4 |
| R9 | 1/5 | 1/8 | 1/2 | 1/9 | 1/4 | 7 | 1/9 | 1/6 | 1 | 1/3 |
| R10 | 1/3 | 1/6 | 2 | 1/7 | 1/2 | 1/5 | 1/8 | 1/4 | 3 | 1 |
| Sum | 23.11 | 8.71 | 45.5 | 4.66 | 30.08 | 18.45 | 2.94 | 16.28 | 47.1 | 36.83 |

Now diving each column with its sum

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 |
| R1 | 0.043 | 0.028 | 0.087 | 0.042 | 0.099 | 0.018 | 0.056 | 0.02 | 0.106 | 0.081 |
| R2 | 0.173 | 0.114 | 0.153 | 0.071 | 0.166 | 0.108 | 0.113 | 0.184 | 0.169 | 0.162 |
| R3 | 0.01 | 0.016 | 0.021 | 0.026 | 0.011 | 0.009 | 0.037 | 0.012 | 0.042 | 0.01 |
| R4 | 0.216 | 0.344 | 0.175 | 0.214 | 0.199 | 0.162 | 0.17 | 0.245 | 0.191 | 0.190 |
| R5 | 0.014 | 0.022 | 0.065 | 0.035 | 0.033 | 0.013 | 0.048 | 0.020 | 0.084 | 0.054 |
| R6 | 0.114 | 0.057 | 0.131 | 0.071 | 0.132 | 0.054 | 0.085 | 0.122 | 0.003 | 0.135 |
| R7 | 0.229 | 0.344 | 0.197 | 0.429 | 0.232 | 0.216 | 0.340 | 0.307 | 0.191 | 0.217 |
| R8 | 0.114 | 0.038 | 0.109 | 0.053 | 0.099 | 0.027 | 0.068 | 0.061 | 0.127 | 0.108 |
| R9 | 0.008 | 0.057 | 0.010 | 0.023 | 0.008 | 0.379 | 0.037 | 0.10 | 0.021 | 0.009 |
| R10 | 0.014 | 0.019 | 0.043 | 0.03 | 0.016 | 0.010 | 0.042 | 0.015 | 0.063 | 0.027 |
| Sum | 23.11 | 8.71 | 45.5 | 4.66 | 30.08 | 18.45 | 2.94 | 16.28 | 47.1 | 36.83 |

Now finding the average of each row and its rank

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | AVG | Rank |
| R1 | 0.043 | 0.028 | 0.087 | 0.042 | 0.099 | 0.018 | 0.056 | 0.02 | 0.106 | 0.081 | 0.065 | 6th |
| R2 | 0.173 | 0.114 | 0.153 | 0.071 | 0.166 | 0.108 | 0.113 | 0.184 | 0.169 | 0.162 | 0.141 | 3rd |
| R3 | 0.01 | 0.016 | 0.021 | 0.026 | 0.011 | 0.009 | 0.037 | 0.012 | 0.042 | 0.01 | 0.028 | 9th |
| R4 | 0.216 | 0.344 | 0.175 | 0.214 | 0.199 | 0.162 | 0.17 | 0.245 | 0.191 | 0.190 | 0.2106 | 2nd |
| R5 | 0.014 | 0.022 | 0.065 | 0.035 | 0.033 | 0.013 | 0.048 | 0.020 | 0.084 | 0.054 | 0.058 | 7th |
| R6 | 0.114 | 0.057 | 0.131 | 0.071 | 0.132 | 0.054 | 0.085 | 0.122 | 0.003 | 0.135 | 0.09 | 4th |
| R7 | 0.229 | 0.344 | 0.197 | 0.429 | 0.232 | 0.216 | 0.340 | 0.307 | 0.191 | 0.217 | 0.27 | 1st |
| R8 | 0.114 | 0.038 | 0.109 | 0.053 | 0.099 | 0.027 | 0.068 | 0.061 | 0.127 | 0.108 | 0.08 | 5th |
| R9 | 0.008 | 0.057 | 0.010 | 0.023 | 0.008 | 0.379 | 0.037 | 0.10 | 0.021 | 0.009 | 0.019 | 10th |
| R10 | 0.014 | 0.019 | 0.043 | 0.03 | 0.016 | 0.010 | 0.042 | 0.015 | 0.063 | 0.027 | 0.039 | 8th |
| Sum | 23.11 | 8.71 | 45.5 | 4.66 | 30.08 | 18.45 | 2.94 | 16.28 | 47.1 | 36.83 |  |  |

**Ranking in Descending Order:**

1. If a camera goes offline or the system is tampered with or is being turned off manually, the user should be notified on the configured device.
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**Volere Prioritization:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Requirement/Product Use Case/Feature | Factor Score out of 10 | %Weight applied | Factor Score out of 10 | %Weight applied | Factor Score out of 10 | %Weight applied | Factor Score out of 10 | %Weight applied |  | Total Weight |
|  | Value to Customer | 40 | Value to Business | 15 | Minimize Implementation Cost | 20 | Ease of Implementation | 25 | Priority Rating | 100 |
| R1 | 2 | 0.8 | 5 | 0.7 | 5 | 1 | 3 | 0.75 | 3.25 |  |
| R2 | 3 | 1.2 | 2 | 0.3 | 4 | 0.8 | 2 | 0.5 | 2.8 |  |
| R3 | 1 | 0.4 | 7 | 1.05 | 2 | 0.4 | 7 | 1.75 | 3.6 |  |
| R4 | 4 | 1.6 | 9 | 1.3 | 5 | 1 | 6 | 1.5 | 5.4 |  |
| R5 | 1 | 0.4 | 9 | 1.3 | 6 | 1.2 | 4 | 1 | 3.9 |  |
| R6 | 3 | 1.2 | 8 | 1.2 | 7 | 1.4 | 5 | 1.25 | 5.05 |  |
| R7 | 8 | 3.2 | 5 | 0.7 | 8 | 1.6 | 9 | 2.25 | 7.75 |  |
| R8 | 3 | 1.2 | 4 | 0.6 | 2 | 0.4 | 6 | 1.5 | 3.7 |  |
| R9 | 0 | 0 | 6 | 0.9 | 3 | 0.6 | 5 | 1.25 | 2.75 |  |
| R10 | 1 | 0.4 | 6 | 0.9 | 4 | 0.8 | 8 | 2 | 4.1 |  |

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